

ABSTRACT OF THE DISCLOSURE

The stepped optical fiber has a core glass member and a surrounding cladding glass member. It has a high numerical aperture (NA) ≥ 0.50 . The core glass member preferably has a zinc-containing composition including, in % by weight, SiO₂, 42 to 53; ZnO, 16 to 38; PbO, 1 to 20; Na₂O, < 14; K₂O, < 12; with a sum of ZnO and PbO ≥ 30 and a sum of Na₂O and K₂O is ≥ 2 . The cladding glass composition, which is compatible with this core glass, includes, in percent by weight, SiO₂, 60 to 72; B₂O₃, < 20; Al₂O₃, < 10; Na₂O, < 18; and K₂O, < 15. The resulting optical fiber has low attenuation, very neutral color transmission and low manufacturing costs. Other cladding glass compositions resulted in considerably poorer properties with too much crystallization at the core glass boundary layer. Environmentally-friendly, lead-free embodiments of the core glass were also prepared having even lower aperture values of ≥ 0.48 .